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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G01N 21/51

A1

(11) International Publication Number: **WO 98/20323**

(43) International Publication Date: 14 May 1998 (14.05.98)

(21) International Application Number: PCT/US97/20539

(22) International Filing Date: 7 November 1997 (07.11.97)

08 May 99/30 mos

(30) Priority Data:
08/747,112 8 November 1996 (08.11.96) US
60/050,809 26 June 1997 (26.06.97) US

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(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published

With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: PARTICLE ANALYSIS SYSTEM AND METHOD

(57) Abstract

A system (20) and method are disclosed for the self-calibrating, on-line determination of size distribution f(x) and volume fraction ϕ of a number of particles (P) dispersed in a medium (M) by detecting one or more propagation characteristics of multiply scattered light from the particles (P). The multiply scattered light is re-emitted in response to exposure to a light source (21) configured to provide light at selected wavelengths. The determination includes calculating the isotropic scattering and absorption coefficients for the particles (P) by comparing the incident and detected light to determine a measurement corresponding to the propagation time through the scattering medium (M), and iteratively estimating the size distribution f(x) and volume fraction ϕ as a function of the coefficients for each of the wavelengths. An estimation approach based on an expected form of the distribution and the mass of the particles is also disclosed. Furthermore, techniques to determine a particle structure factor indicative of particle-to-particle interactions which vary with particle concentration and influence light scattering at high concentrations is disclosed.